Karnataka State Akkamahadevi Women's University, Vijayapura

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In

Physical Education

On

Analytical Study on Physical Activity, Body Mass Index and Motor Fitness In Relation To Fundamental Movement Skills of Selected Urban and Rural Children

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INTRODUCTION

Sports and games can be viewed as evolved versions of ancient physical activities, which have their roots deeply embedded in our human history. These fundamental motor skills and physical patterns, essential to the human experience, encompass a wide range of dynamic movements that are both instinctive and integral to our physicality. Activities such as running, jumping, and throwing represent some of the most basic forms of movement that humanity has engaged in for centuries, often originating from survival needs and the natural environment.

As we delve deeper, we find that actions like climbing, leaping, swinging, hanging, pulling, pushing, holding, catching, gripping, and lifting are not simply isolated tasks; they are foundational elements that contribute to a broad spectrum of athletic disciplines. Over time, these basic movements have been systematically refined and structured, giving rise to the organized sports we know today.

For instance, the simple act of running has evolved into track and field competitions, where speed and endurance are meticulously tested. Similarly, jumping has transformed into various events like high jump and long jump, each with its own set of rules and techniques. Throwing, once a means of survival or hunting, has been cultivated into sports such as baseball and javelin throw, showcasing skill and precision.

Moreover, the complexities of climbing and swinging have led to the growth of sports like gymnastics and rock climbing, where agility and strength are paramount. The dynamics of holding, catching, and gripping have given birth to ball games, ranging from basketball to volleyball, emphasizing teamwork and strategy as well as individual prowess. Even lifting, a primal human capability, has found a specialized place in sports like powerlifting and weightlifting, showcasing the sheer strength and determination of athletes.

In essence, modern sports and games serve as a sophisticated reimagining of these age-old physical skills, codifying them into structured formats that not only entertain but also challenge and inspire individuals across the globe. They reflect our evolution as a species, highlighting the journey from primitive physicality to the highly competitive and organized realm of sports that we enjoy today. Thus, while the forms and rules may have

transformed, the essence of human movement remains a timeless thread that connects the past with the present.

The gradual repetition of fundamental motor patterns led to the development of new activities through repeated actions and responses. Almost all the sporting activities of today are modifications of these racially old fundamental movement activities, which have been converted, with a definite framework of rules and regulations, to suit various requirements of a vast majority of people the world over.Fundamental Movement Skills are basic body movements that involve various body parts. Fundamental Movement Skills are a set of basic movement patterns that are essential for the development of physical literacy. These skills form the building blocks for more complex movements and enable individuals to participate in wide range of physical activities and successful participation in games and sports.

Types of Fundamental Movement Skills

1) Locomotors Skills- It is a type of movement in which the body travels through space from one location to another location. Locomotor Skills such as Run, Gallop, Hop, Leap, Jump and Slide

2) Object control Skills (Manipulative skills) - They are movements of certain body parts or even the whole body without causing the body to travel. Object control skills such as Strike, Dribble, Catch, Kick, Overhand Throw and Underhand Throw.

3) Balance skills- Movements where the body remains in place, but moves around its horizontal and vertical axes. Balance skills such as balancing, twisting and turning.

Fundamental movement skills are the key to addressing issues of participation levels in physical activity and in addressing the increasing obesity levels amongst the general population. If students are proficient in fundamental movement, skills they are more likely to participate in games and sports and establish long life commitment to health and physical activity.

Physical Activity defined as any bodily movement produced by skeletal muscles that result in energy expenditure. Physical Activity in daily life can be categorized into occupational, sports, conditioning, household or other activities. Regular Physical Activity and health related physical fitness are key indicators of health outcomes.

Engage in physical Activity in the early years of childhood brings a range of positive health outcomes, such as maintain a healthy weight, cognitive development , bone and

skeletal, psychosocial, and cardio metabolic health. Physical Activity reduces the risk of cardiovascular disease, cancer and type-2 diabetes, improves musculoskeletal health and can reduce symptoms of depression. It also improve mood and self esteem. In Physical Activity, guidelines in the World Health Organization (WHO) recommend that children age group of 5 to 17 years old should engage in at least 60 minutes of Moderate to vigorous-intensity Physical Activity daily. Physical Activities affect the BMI value and body composition.

Body composition is one of the health related physical fitness. It describes the percentage of fat, muscle, water and bone in the human body. Excess calories converted into fat and stored in our body. On the contrary, muscle mass is the predicted weight of muscle in the body. Muscle mass includes the skeletal muscles, smooth muscles and cardiac muscles which act as an engine in consuming energy.

Hydrometry, Hydro densitometry, Dual energy X-ray, Air displacement, Plethysmography, Skin fold method, anthropometric measurements and bioelectrical impedance analysis methods (BIA) are used to measure the body composition. In anthropometric measurements, BMI is commonly used to classify as obese, overweight, and underweight.

BMI stands for Body Mass Index and is a measure of an individual body fat based on their height and weight. It is a numerical value calculated by dividing a person's weight in kilograms by the square of their height in meters. The resulting number is then compared to standard BMI categories to determine whether an individual is under weight, normal weight, overweight or obese.

Physical fitness is necessary for everyone to maintain their body. Physical and psychological health is maintained positive with the help of general motor fitness. The term of 'Motor Fitness' became popular during World War 2.

The term 'Motor' has been defined as the relationship between central nervous system and the muscle. This is also referred as the neuromuscular co-ordination. Motor fitness refers to the ability of an individual to perform physical activities that require the coordination of different body parts and the use of multiple groups. Motor fitness is important for overall fitness and is crucial for maintaining a healthy lifestyle and wellbeing

as it can help individuals perform daily tasks with ease, reduce the risk of injury and improve sports performance.

Motor fitness is composed of several components such as agility, balance, coordination, reaction time, power, endurance and speed.

STATEMENT OF THE PROBLEM

The purpose of this study is to assess the Physical Activity, Body Mass Index and Motor Fitness in relation to Fundamental Movement Skills of selected Urban and Rural Children.

OBJECTIVES OF THE STUDY

1. To find out the relationship between Fundamental Movement Skills and Physical Activity.
2. To investigate the relationship between Fundamental Movement Skills and Body Mass Index.
3. To examine the relationship among Fundamental Movement Skills and Motor Fitness.
4. To find out the interrelationship between fundamental Movement Skills, Physical Activity, Body Mass Index and Motor Fitness of urban and rural children.
5. To examine the difference among urban and rural children in Fundamental Movement Skills, Physical Activity, Body Mass Index and Motor fitness.
6. To investigate the difference among Male and Female children in Fundamental Movement Skills, Physical Activity, Body Mass Index and Motor fitness.
7. To explore the difference among Mandya and Mysuru district school children in Fundamental Movement Skills, Physical Activity, Body Mass Index and Motor fitness.
9. To assess the performance of Fundamental Movement skills, Physical Activity, Body Mass Index and Motor Fitness in urban and rural children.

SIGNIFICANCE OF THE STUDY

1. This research is important for physical educators, parents, teachers and coaches in order to have a better understanding of fundamental movement skill development and ability in early elementary age children.

2. The study can help to identify children who may be experiencing motor development delays in their Fundamental Movement skills, which can lead to early interventions and support.

3. This study Help to identify potential areas for intervention by understanding, which Fundamental Movement Skills children struggle with and how these skills relate to BMI, Physical Activity and Motor Fitness, schools, coaches and parents can, create targeted programs and interventions to support children's development.

4. This study can inform policies and guidelines related to physical education and health promotion in schools and communities.

5. This study can provide insights into the factors that influence children's health and wellbeing, such as physical activity and motor fitness. This can help parents; physical educators and policy makers design interventions that promote healthy lifestyles and physical activity among children.

6. This study can raise awareness among physical educators, coaches and parents about the importance of physical activity and motor fitness in children's development, providing them with the knowledge and tools to support and encourage healthy lifestyles.

DELIMITATION

1. This study is confined to only primary school male and female children from the selected schools of Mandya and Mysuru districts of Karnataka state.
2. The subjects for the study is delimited to the 240 Male and Female children only, (80 from each districts)
3. The subjects delimited 80 male and 80 female children (40 male and 40 female from each districts).
4. This study delimited to 40 urban Male and 40 urban Female and 40 rural Male and 40 rural Female children only (80 urban and 80 rural from each districts).
5. The age group of the subjects ranged from 9 to 10.9 years.
6. The study delimited to the following independent variables.

   Physical Activity - Physical Activity

   Body Composition – Body Mass Index

   Motor Fitness – Speed, Power, Agility

7. The study delimited to the following depended variable.

Fundamental Movement Skills

Locomotor Skills	Object Control Skills
Run, Hop, Leap, Horizontal Jump, Gallop, Slide, skip.	Strike, Bounce, Catch, Kick, Overhand Throw.

LIMITATIONS

1. As the number of subjects is selected for the present study are more the tests will to be conducted on different days.
2. No specific motivation techniques will be use to encourage the subjects to attain their maximum performance during testing.
3. Moods and Health status of the subjects during the performance are beyond the control of the investigator.
4. Life style of the subjects affecting their nutritional status is beyond the control of the investigator.
5. Climate condition and environmental factors is beyond the control of the investigator.
6. The students are from different social, cultural and economic status which is considered as a limitation for this study.
7. The responses of the subjects to the statements in the questionnaire will depend upon various factors such as understanding of the statements, seriousness and sincerity of the subjects.

HYPOTHESIS

1) There may be a relationship of Fundamental Movement skills to Physical activity variable of urban and rural children.

2) The Body Mass Index variables of urban and rural children may be associated with their Fundamental Movement Skills.

3) The Motor Fitness variables of Fundamental Movement Skills in urban and rural children may be correlated.

4) It is possible that the Fundamental Movement Skills, Physical Activity, Body Mass Index and Motor Fitness of children residing in urban and rural children could be interrelated.

5) Urban and rural children may exhibit variations in their Fundamental Movement Skills, Physical Activity, Body Mass Index and Motor fitness.

6) It is possible that there are differences in the Fundamental Movement Skills, Physical Activity, Body Mass Index and Motor Fitness between male and female children in urban and rural areas.

DEFINITION OF THE TERMS

Analytical

According to Cambridge Dictionary Analytical defined "examining or liking to examine things in detail, in order to discover more about them."

Physical Activity

Physical activity is defined as "any bodily movement produced by the skeletal muscles that results in energy expenditure". (Caspersen, Powell & Christenson, 1985)

Body Mass Index

According to McArdle and Katch defined Body Composition is the chemical and anatomical makeup of the body, including its fat free mass and fat mass.(McArdle and Katch 2015)

Motor fitness

Motor fitness is "a readiness or preparedness with special regard for big muscle activity without undue fatigue". (Barrow 1968)

Fundamental Movement Skills

Are defined as "basic learnt movement patterns that do not occur naturally and are suggested to be a foundation for more complex and advanced physical and sporting activities".(Barnett, 2016)

Urban

According to the Census of India (2011), an urban area defined as a settlement with a population of more than 5,000 people, both males and females, and having a density of 400 persons per square kilometer or more.

Rural

According to the Census of India (2011) , an rural area defined as any place outside the limits of a municipal corporation, municipality, or a cantonment board, where the population density is less than 400 per square kilometer and at least 75% of the male working population is engaged in agriculture and allied activities.

REVIEW OF RELATED LITERATURE

1)Fie – Fie Ma and Dong –Mie Luo (2023). The purpose this study was to examine the possible correlation between physical activity, fundamental motor skills and body mass index in preschool children. Additionally, they investigated the disparities in physical activity and fundamental motor skills between preschool children who or normal weight and those who are overweight or obese. The study involved 366 preschool children between the ages of 3 to 6 years, out of which 358 children completed all the tests. The sample consisted of 194 boys and 164 girls. The researchers used a triaxial accelerometer to measure physical activity levels, the gross motor development 2nd edition to assessed fundamental motor skills and anthropometric measurements to measured body weight and height. The statistical analysis was conducted using SPSS25.0 software. Descriptive statistics and frequency calculations were utilized to examine the demographic, anthropometry, PA, and FMS variables. To compare overweight/obesity rates between genders, a Chi-square test was employed. An Independent Samples T-test was used to compare PA levels and FMS levels between male and female preschoolers of the same age group. ANOVA and post hoc analysis conducted to investigate the differences in PA and FMS levels among ages in both genders. Additionally, a partial correlation analysis performed to explore the correlation between BMI, PA, and FMS levels. Finally, ANCOVA was utilized to compare the BMI, PA, and FMS levels between normal and overweight/obese subjects. The result found that there was a strong and positive correlation between physical activity and both locomotor and object control skills in preschool children.

However, there was no significant correlation between FMS,PA and BMI. The ANCOVA results indicated that there was no statistically significant variation in FMS between preschool children who were of normal weight and those who were overweight or obese. Interestingly, normal weight girls had longer MPA and MVPA duration and shorter sedentary periods compared to overweight or obese girls. In conclusion, it is crucial to implement effective measures to address the issue of overweight or obesity in preschool children. The study findings suggest that physical activity has a strong and positive correlation with both locomotor and object control skills in preschoolers. However there was no significant relationship between BMI and either FMS and PA during the development stage.

2)Hua Wu., et al.(2021). The research aim was to explored the Relationship between Functional movement skills, Motor Fitness and Fundamental Movement skills, and the subject age group among 7 to 10 years old. Used seefeld's model for empirical research, the study randomly chosen one class from each schools (grade 1 to 4) and had 30 students from each class taken the TGMD-2 test (Object control skills and Locomotor skills) and Chinese National Physical Fitness Test(50m sprint, sit-and-reach test, and timed rope skipping). Quality Management Plan (QMP) used to assess the Functional Movement skills. In total 117 children participated in three tests, included 42 girls. The data analyzed through Chi square test to evaluate the correlation between FMS, MF and $FMS_{tm.}$ The investigator concluded the study that 1) boys outperformed girls in object control skills and overall FMS proficiency. 2) The correlation between FMS and Motor Fitness was week.

3)Kipling, W., E., (2021).This study aimed to investigate the relationship between Body composition (fat mass, fat percentage and fat-free mass) and Fundamental Movement skills in Children and to compare the effectiveness of using Body Mass Index (BMI) versus Bio-Electrical impedance analysis in measuring Body composition. The study included 244 children from the southeastern portion of the United States. The Fundamental Movement Skills were assessed and evaluated by Test of Gross Motor Development 2, Body Composition was measured with the Tanita Sc- 331S analysis, and BMI was calculated based on CDC norms charts. The Study Results showed that Fat- free mass was found to be

a significant predictor of locomotor skills and total motor skills models, while BMI also had predictive power in both models. These findings suggest that different components of Body Composition may be associated with different aspects of Motor skill proficiency and that BIA may be a more effective tool in field-based assessment of Body Composition about Motor skills development in children.

4)Raut, S. T., & Tripathy, S. (2020).The Researcher's objective was to examine the correlation between Physical Characteristics of Body Structure and Motor abilities by examining selected Anthropometric measurements. (BMI, palm length, arm length and leg length) and Fundamental skills, including locomotor (50mts run and Horizontal and vertical jump) and ball skills(Dribble, catch and kick), among primary school students aged 7-10 years old in Amravati city, Maharashtra. Some locomotor and ball control skills were used to measure the Fundamental skills and standardized equipment for Anthropometric measurements. The data was analyzed through the Pearson correlation and coefficient test, and a sample of 48 male students was chosen through simple random sampling. The result showed there was a significant relationship between Anthropometric measurements and Fundamental Movement Skills in Children.

5)Behan S., et al. (2020). The researchers attempted to investigate the correlation between fundamental movement skills (FMS) and health-related fitness (HRF) components in children. The study involved a diverse group of Irish primary school children aged between 5 and 12 years. FMS evaluated using the Test of Gross Motor Development (TGMD-3), as well as two additional assessments of balance and vertical jump. The researchers assessed all aspects of health-related fitness (HRF), which encompassed various measurements such as body mass index (BMI) and waist circumference for body composition, hand dynamometer for muscular strength (MS), plank test for muscular endurance (ME), back-saver sit-and-reach for flexibility, and the 20 m PACER test for cardiovascular endurance (CVE). The study utilized hierarchical multiple regressions to examine the connections between the various components of health-related fitness (HRF) and fundamental movement skills (FMS), including locomotor, object control, and balance skills. The findings revealed that FMS was positively associated with muscular strength (MS),

flexibility, and cardiovascular endurance (CVE) while displaying an inverse relationship with body composition. These results highlighted the dynamic nature of the relationship between FMS and HRF, which tends to strengthen, as children grow older.

METHODOLOGY

In this chapter, selection of subjects, selection of variables, selection of tools and statistical technique will be discussed.

The purpose of this study is to assess the "Physical Activity, Body Mass Index and Motor Fitness in relation to Fundamental Movement skills of selected urban and rural children "

Selection of Subjects

To achieve these purpose 180 selected urban and rural male and female children will be selected through simple random sampling technique, as subject's age group range between 9 to 10.9 years.

S.N	**Mandya**				**Mysuru**				**Total**
01	**80**				**80**				
02	**Urban**		**Rural**		**Urban**		**Rural**		**160**
03	**40**		**40**		**40**		**40**		
04	**F**	**M**	**F**	**M**	**F**	**M**	**F**	**M**	
	20	**20**	**20**	**20**	**20**	**20**	**20**	**20**	

The below table show the variables**,** Test/Tools and the unit of measurement of selected Physical Activity, Body Mass Index, Motor Fitness and Fundamental Movement Skills Variables will be used in this study.

Physical Activity variables

SL. No	Variables	Test/Equipment Needed	Criterion Measurement
1	Physical Activity	Children Physical Activity Questionnaire (PAQ-C)	5 Point Rating Scale

Body Mass Index Variables

SL .NO	Variables	Test/Equipment Needed	Criterion Measurement
1	Height	Stadiometer	centimeters
2	Weight	Weighing scale	Kilogram

Motor Fitness Variables

SL .NO	Variables	Test	Equipment Needed	Criterion Measurement
1	Speed	30 meters dash run	Stop watch, Cones	Should be recorded nearest tenth of a second
2	Power	Standing Broad Jump	Mat/ Floor , Measuring Tape	In Meters
3	Agility	T- test	Cones, Stopwatch, measuring tape	Should be recorded nearest tenth of a second

Fundamental Movement Skills

(Test of Gross Motor Development -2 (TGMD-2))

SL .NO	Variables	Test	Equipment Needed	Criterion Measurement
1	Locomotor Skills	1.Run	50 feet clear space, masking tape, Chalk	If a participant demonstrates the

			and Cones, Score card	criteria, he or she receives a 1.if not a 0, it includes the total raw scores (0-48 points) of the observed criteria for each subscale, raw score can be converted to percentiles and standard scores.
		2.Gallop	30 feet of clear space , Score card	
		3.Hop	15 feet of clear space, Score card	
		4.Leap	30 feet of clear space, Score card	
		5.Horizontal Jump	10 feet clear space and masking tape , Score card	
		6.Skip	30 feet clear space and masking tape, Score card	
		7.Slide	30 feet clear space and masking tape, Score card	
2	Object Control skills	1.Strike	4-6 inch light-weight ball and plastic bat	If a participant demonstrates the criteria, he or she receives a 1.if not a 0, it includes the total raw scores (0-48 points) of the observed criteria for each subscale, raw score can be converted to percentiles and standard scores.
		2.Catch	6-8 inch sponge ball, 15 feet of clear space and masking tape	
		3.Kick	8-10 inch plastic or slightly deflated playground ball, 30 feet clear space and masking tape	

		4.Overhand Throw	Tennis ball, a wall and 25 feet of clear space	
		5.Bounce	8-10 inch ball and flat hard surface	

Statistical Technique and Analysis

- To test the hypothesis discriminate analysis in SPSS statistical package (version 22.0).
- Descriptive statistics used to describe and summarize the study variables, such as mean, standard deviation frequency distributions, charts and graphical representation.
- Pearson's product moment correlation and coefficient used to examine the relationship between the study variables like physical Activity, Body Mass Index, Motor Fitness and Fundamental Movement Skills.
- Multiple regression analysis used to examine the relationship between the four variables predict the impact of independent variables (Fundamental movement skills, physical Activity, Body Mass Index, and Motor Fitness) and .
- T-test used to determine if there is a significant difference in the means of two groups (urban vs. rural children) for a particular variable.
- MANOVA is used to analyze the differences among groups urban vs rural, male vs female.

Research Gap

The literature review revealed that there was a significant amount of research on physical activity, body composition in children but there is a gap in the literature on. The research shows that we know a lot, about how physical activity and body composition affect children, but we do not know enough about how these factors relate to the development of basic movement skills in kids who lives in urban versus those who live in rural areas. We also need to understand how motor fitness affects the development of these skills.

Therefore, there is a need for research that specifically focuses on the relationship between physical activity, body composition, and motor fitness and the development of fundamental movement skills in urban and rural children. This research can inform the development of targeted interventions to promote the development of fundamental movement skills in both urban and rural children, and ultimately improve their physical health and well-being.

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